

ABSTRACT OF THE DISCLOSURE

5 This invention is to sufficiently reduce a change
in optical characteristic of an optical system due to
gas mixture in each space in the optical system and to
10 resolve a pattern image with a small line width. A
projection optical system (22) has lenses (2a - 2c) as
a plurality of optical elements, a holding member (3)
for holding the lenses, and a lens barrel (1) serving
as a vessel for accommodating the lenses (2a - 2c) and
15 holding member (3). The lens barrel (1) has at least
two spaces (51a, 51b) inside. A gas contained in one
space (51a) has a refractive index different from that
of a gas contained in the other space (51b). The
pressure of the gas in one space (51a) is different
20 from that of the gas in the other space 51b. The
vessel (1) has gas supply ports (5a, 5c) for
independently supplying the gases into the two spaces
(51a, 51b) and gas exhaust ports (5b, 5d) for
exhausting the gases.